PROGRAM: **Precision Manufacturing**

PROGRAM CIP CODE: **48.0500**

DESCRIPTION: The **Precision Manufacturing** program is designed to introduce students to basic precision manufacturing principals and technical skills. Students will be prepared in the following instructional areas: manufacturing systems, production planning and quality control, documentation, technical problem-solving, management information systems, predictive/preventive maintenance and automated manufacturing. Students will have the opportunity to earn an industry recognized NIMS level 1 certification. The program is comprised of one core course and three options: Option A (Automation/Robotics); Option B (Computer Controlled Fabrication); or Option C (Product Layout and Development.) The program uses a delivery system made up of four integral parts: formal/technical instruction, experiential learning, supervised occupational experience, and the Career and Technical Student Organization, SkillsUSA.

RECOMMENDED PROGRAM SEQUENCE OF COURSES:

Career Preparation

The following describes the recommended courses developed from industry-validated skills necessary for initial employment or continued related education.

48.0500.10 **Fundamentals of Precision Manufacturing:** This course includes units of instruction in computer control and power systems used in manufacturing. Units also include set up and change-over techniques, using industrial instruments and utilizing technical skills. Instruction also includes careers opportunities in manufacturing, communications skills, work-based learning experiences, teamwork, safety, creative thinking and problem solving.

-and-

One of the following Career Preparation options will be included as part of the instructional sequence for this program:

Option A

48.0500.20 **Automation/ Robotics:** Students in this course will learn how automation reduces the need for human labor. Students will understand the math, science and technology of robots, their design, and application in industrial automation for manufacturing. Students will learn control systems, robotics and computer applications and how they are used to control machinery in industry. Students will gain a working knowledge of electronics, programming, mechanics and applicable software through technical skills in support of technicians and other personnel engaged with robotics**.**

-or-

Option B

48.0500.30 **Computer Controlled Fabrication:** in this course students develop a clear understanding of mechanical systems including engines, pumps, medical devices; as well as the need for highly accurate parts via modern CAD-CAM systems to produce 3-D developed components. Students will learn how tighter tolerances require ultrahigh precision machining to be competitive in the aerospace industry. Students will have the opportunity to earn an industry recognized certificate verifying the student's practice of machine geometry, motion control and machining strategy.

-or-

Option C

48.0500.40 **Product Layout and Development:** This course introduces students to specific layout and product design technology. Students will use first year NIMS skills; bench work, blue print reading and mechanical skills to expand to product design using CAD programs, CNC programming, CNC operations with an emphasis on Rapid Manufacturing. Further experiences will include analysis and testing on new products under development. Emphasis will be placed on creative and innovative thought in the design processes.

And program may elect to add:

48.0500.75 **Precision Manufacturing - Internship:** This course provides CTE students an opportunity to engage in learning through participation in a structured work experience that can either be paid or unpaid and does not necessarily require classroom instruction that involves the application of previously developed Precision Manufacturing knowledge and skills.

-or-

48.0500.80 **Precision Manufacturing - Cooperative Education:** This course utilizes cooperative education methodology to combine school-based and supervised work-based learning experiences directly related to the standards identified for the Precision Manufacturing program.

TEACHER CERTIFICATION REQUIREMENTS FOR THE PRECISION MANUFACTURING PROGRAM

CAREER PREPARATION: The instructor must be vocationally certified according to the following table

Precision Manufacturing	CERTIFICATES
	Types: PVI, SVI, PCTI, SCTI

Note:

- **Precision Manufacturing, 15.0600.70** may be a part of the sequence and the teacher must hold a Cooperative Education Endorsement (CEN).
- Teacher/Coordinator **15.0600.75** is not required to have a Cooperative Education Endorsement (CEN).
- Teacher/Coordinator **15.0600.80** is required to have a Cooperative Education Endorsement (CEN).

CERTIFICATE ABBREVIATIONS FOR THE PRECISION MANUFACTURING PROGRAM

Certificate Types	
PCTI	Provisional Career and Technical Education Industrial Technology
SCTI	Standard Career and Technical Education Industrial Technology